

NAVY MEDICINE

November-December 1998



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NAVY MEDICINE

**Vol. 89, No. 6
November-December 1998**

Department Rounds

- 1** Caring for Guantanamo Bay's Cuban Exile Community
CAPT B.K. Bohnker, MC, USN

Features

- 4** Baltic Challenge: Partnership for Peace Program
CAPT P.M. Collins, NC, USNR
- 6** *Comfort* Courage Pays Off for Local Lithuanian Man
- 8** Great Hope Results in Great Comfort
JO1(SW) F.R. Keeley, USN
- 10** Advances in Navy Pharmacy Information Technology: Accessing Micromedex via the Composite Healthcare Computer System and Local Area Networks
LCDR S. Koerner, MSC, USN
F. Becker
- 13** The Development and Refinement of Naval Health Services Doctrine
LT M. Morales, MSC, USNR
CAPT E.P. Wyatt, MSC, USN
- 18** *The Zone*: Dietary Cure-All or Junk Science?
LT L. Cox, USN
LT K. Zuzelski, USN
- 22** Steamin' With the Army
LCDR C. Patterson, DC, USN
- 25** Navy Medicine Research and Development Highlights

A Look Back

- 29** Navy Medicine 1920
- 26** INDEX Vol. 89, Nos. 1-6, January-December 1998

COVER: From 24 June through 15 Aug, USNS *Comfort* (T-AH 20) took part in Baltic Challenge '98. Stories on pages 4, 6, and 8. Photo by HMCM(SW) T. Webb.

Caring for Guantanamo Bay's Cuban Exile Community



USAF medevac personnel assist a Cuban exile onto a C-141 at NAS Guantanamo Bay.

As the sole medical facility on the U.S. Naval Base at Guantanamo Bay, Cuba, the Naval Hospital uniquely supports a community of Cuban exiles within the base population of 4,600. Most of these exiles left their homeland in Cuba following the revolution and subsequent communist dictatorship almost 40 years ago, though some joined the group from other Caribbean countries

through marriage or extended employment on the base. They remain on the isolated base as an aging population totally dependent on the hospital for their medical care. The Cuban exiles have SECNAVDESIGNEE status(1) and receive tertiary care via the USAF medevac system to the National Naval Medical Center, Bethesda, MD, and Naval Medical Center, Portsmouth, VA.

Routine medical support for this aging population exceeds usual military medical requirements by including long-term care responsibilities. For example, Clarabel Rodd and Georgiana Hurley were inpatients for several years until their deaths in 1996. Their prolonged inpatient status resulted from the absence of other options on the isolated base which is about 500 miles from Miami, FL. A

Cuban Exiles by Age and Gender

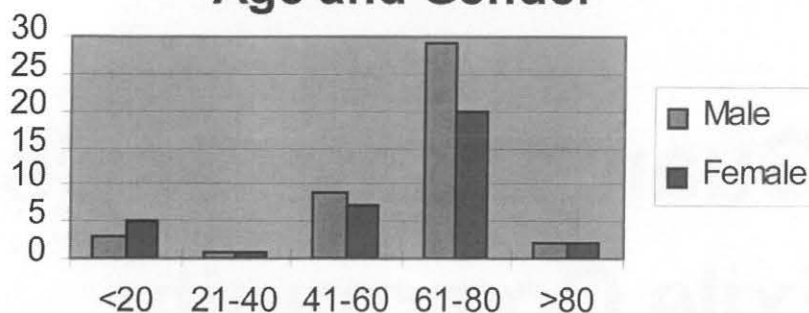


Chart 1. Ages/Gender of Exile Population

long-term care facility had been considered, but has not come to fruition for a number of factors. As part of recovery from Operation Sea Signal and through the BUMED strategic planning process, the medical care requirements for that population was reviewed.

The vision of the hospital expanded from a long-term residential care facility to identify the needs of the Cuban exile population and alternatives to meet those needs. That vision generated the "Cuban Exile Managed Care Advocacy Committee" (CEMCAC) from our hospital staff (Table 1). The

committee evaluated the care needs of the Cuban exile population, beginning with vital statistics such as ages, sex, births, deaths, and permanent departures from the island (Chart 1). The relationship of U.S. Naval Station Guantanamo Bay with the host country precludes local, state, or national government management of vital statistics for that group. Births in the Cuban exile population may be unexpected, but second and third generation Cuban exiles continue to live and work on the base, so families continue. Birth and death information was obtained through review of Naval Hospital records. Permanent departures were determined from community inquiries and base housing records, since all the Cuban exiles live in government-furnished quarters on base.

The committee conducted a needs assessment of the population, reviewing health records and interviewing people during periodic home visits by the community health nurse. Using this information, age-specific preventive medicine strategies were implemented, including screening for colorectal cancer, hypertension, diabetes, and glaucoma (Chart 2). Basic immunizations were updated and education on advanced directives provided, a task further complicated by transcultural differences in aging and health. The committee worked to smooth the medevac process which can be daunting to aging exiles. Case management was implemented for Cuban exiles with multiple complex medical problems.

The committee examined options for long-term care of the Cuban exile

% Cuban Exiles over 40 yrs with Medical Conditions

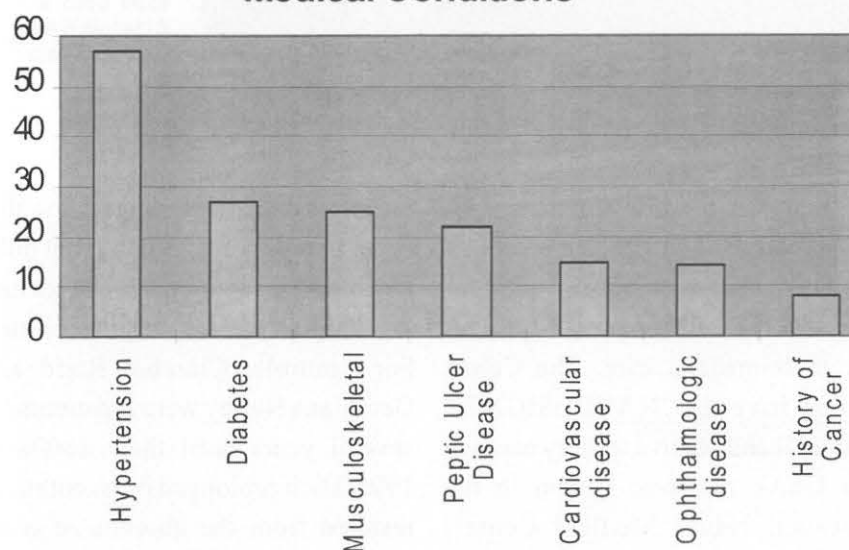


Chart 2. Diseases Common to the Population Over 40

Table 1. Membership of the Cuban Exile Managed Care Advocacy Committee (CEMCAC)

Community Health Nurse
Staff Internist
Dietitian
Physical Therapy Technician
Optometry Technician
Pharmacy Technician
Nursing Service Representative
Fiscal Representative
Facilities Representative
Patient Affairs Representative



A hospital corpsman gives an injection to a Cuban exile patient.

population, a problem previously solved only by prolonged inpatient stays in the hospital. The cost of long-term care in CONUS was deemed cost-prohibitive and culturally unacceptable. A home health care model was accepted with a goal to keep the exile community in their government-owned homes as long as possible. Under the auspices of the community health nurse, home health care workers were sought

and individual care plans developed. Caretaker status for the population was reviewed (Chart 3) to better predict future needs under the home care model.

With strong support from COMNAVBASE Guantanamo Bay, and due to the uniqueness of Guantanamo Bay, the committee recommended housing changes for Cuban exiles. These efforts have moved three eld-

erly Cuban ladies with musculoskeletal problems that limited stair climbing to more acceptable housing. The physical therapy technicians modified the government-owned homes to better suit the patients with physical disabilities. A "meals on wheels" program has been implemented to support a select part of the population to meet individual needs.

The CEMCAC has assisted the U.S. Naval Hospital Guantanamo Bay to provide a quality health benefit to a unique community on this isolated base. It has reaffirmed the U.S. commitment to the Cuban exile population who have given so much of their lives in service to our government and demonstrates Navy medicine's health benefits commitment to all those entrusted to our care.

Reference

1. CNO Itr Ser 00/1U500125 of 10 April 1991. □

—Story by CAPT Bruce K. Bohnker, MC, Executive Officer, U.S. Naval Hospital Guantanamo Bay, Cuba.

Cuban Exiles by Caretaker Status

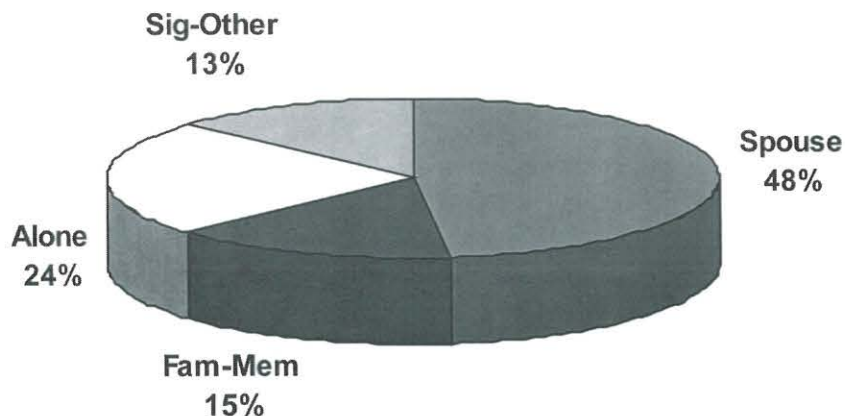


Chart 3. Care Givers by Status

Features

Following its 6-week deployment supporting Baltic Challenge '98, *Comfort* receives fuel from oiler USNS *Laramie* (T-AO 203) near Norfolk, VA.



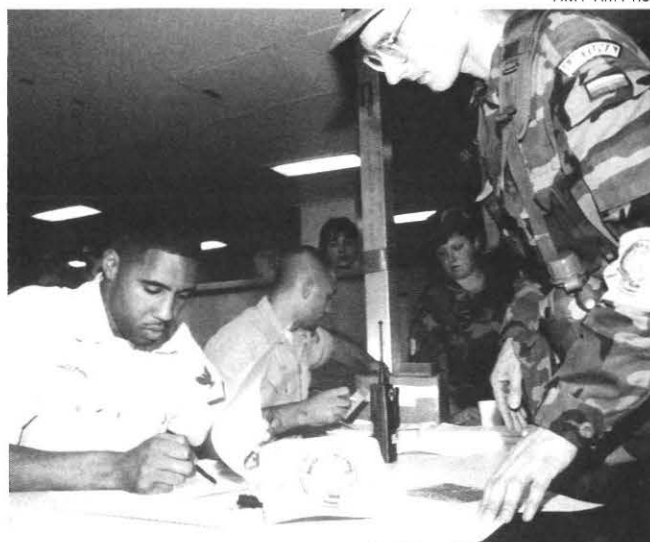
Baltic Challenge: Partnership for Peace Program

CAPT Patricia M. Collins, NC, USNR

During its first deployment to the European theater, USNS *Comfort* (T-AH 20) participated in exercise Medical Central and Eastern Europe (MEDCEUR) 98-2, part of Baltic Challenge '98, from 24 June through 15 Aug. With 1,000 beds and 12 operating rooms, *Comfort* is one of the largest U.S.

trauma facilities on land or sea with sophisticated support equipment designed to provide mobile, flexible, rapidly responsive afloat medical capabilities in support of the operating forces. This description of the USNS *Comfort* also describes the attributes of the medical crew as well.

Approximately 1,400 personnel from Lithuania, Latvia, Estonia, Norway, and Sweden participated in MEDCEUR 98-2, a series of joint and combined operations to improve medical mass casualty operations, planning and coordination skills, and multilevel medical training. Based on providing humanitarian assistance following an



Above and left: Lithuanian troops check aboard *Comfort* for combined training exercises.

earthquake in Lithuania, the exercise scenario activities included medical training operations to test the readiness aspects of *Comfort*. Multiple ship and treatment facility mission training included patient evacuation, communications procedures, helicopter operations, handling mass casualties, humanitarian operations, telemedicine, and operating with non-governmental and private volunteer organizations.

Navy medicine's participation in exercise Baltic Challenge '98 contributed to the Partnership for Peace program and validated our medical readiness to our fighting forces, friends, and allies.

The National Naval Medical Center (NNMC), Bethesda, MD, provided 577 of the medical personnel deployed aboard *Comfort* for this exercise. Medical force integration included 400 Navy reservists who augmented staff at NNMC to avoid disruption of health care services during the ship's deployment. Of the

750 doctors, nurses, and corpsmen who deployed aboard *Comfort*, 50 were Selected Reservists.

Telemedicine technology was one of the prime demonstration features that *Comfort* offered to MEDCEUR 98-2. It served to demonstrate the enhancement of medical treatment by producing and transferring digi-

Comfort Courage Pays Off for Local Lithuanian Man

Four sailors from the U.S. Navy hospital ship *Comfort*, anchored near Klaipeda, Lithuania, helped rescue and provided first aid to a local resident in distress. ABH1 Edward McCellan and AFB2 Anthony Garcia were in a restaurant near the Dane river in Klaipeda when they noticed a local man who appeared intoxicated on a nearby bridge. Moments later a cry went up and the man was gone. People rushed to the steep edges of the river. This attracted the attention of HM3 Jody Money and HM3 Donald Montgomery, who ran to the seawall to see the man thrashing about near the center of the river.

McCellan and Garcia were preparing to enter the water when two local fishermen in a rowboat came out from under the bridge and approached the victim. He appeared to fight their attempts to rescue him until he tired and slipped under the water. One of the alert fishermen then grabbed the victim but was unable to gather him into the boat.

Garcia climbed down onto a slender ledge just above the waterline and leaned out to help bring the man to shore. McCellan grabbed Garcia by the belt and kept him from falling in the water also freeing both his hands for the rescue. Montgomery also came down on the ledge to assist Garcia,

and Money followed McCellan's example and served as an anchor for Montgomery. The boatmen pushed the victim to the river's edge where he was grabbed by Garcia and Montgomery and hoisted up on the sidewalk running beside the unfenced edge of the river.

Montgomery and Money, Navy hospital corpsmen, began to assess the victim's condition, taking vital signs and checking for possible injuries. "The man was conscious and breathing on his own, although his pulse was weak and erratic," said Money.

"I couldn't find any other injuries, so we just looked after him and kept him calm until the local rescue squad arrived," Montgomery explained. "They got there very quickly. Once we got the victim out of the water, the corpsmen took over like paramedics," said Garcia of his shipmates.

"No one would have known anything about it, except a reporter happened by and took our picture at the scene," Montgomery admitted with a smile. What started as a relaxing evening in a foreign town, turned out to be an opportunity to help a fellow man, and the four *Comfort* crewmembers walked away proud as visiting American ambassadors.

—NNMC Public Affairs Office,
Bethesda, MD.

tized X-rays and CT scans to NNMC. The speed of transmission during a live video-teleconference on a rare neurosurgical procedure resulted in a dramatic successful postoperative course for a 13-year-old Lithuanian boy. In addition, radiologists on board *Comfort* augmented the radiology staff at NNMC by reading CT scans and X-rays during heavy radiology workload periods at NNMC.

The portability of the transfer of information throughout the ship through web technology greatly enhances timely diagnosis and treatment and has important implications for disaster preparedness and mass casualty care. Use of miniature portable computers for rapid consultation for casualties located on other ships or another part of the ship greatly enhances speed of diagnosis and access to the appropriate medical specialist in triage.

Some reservists thought that the brief taste of sea life was the most valuable part of the training. The crew's triage and treatment skills were put to the test during a 2-day mass casualty drill observed by medical personnel from other participating nations.

LT Gail Holzworth, NC, USNR, an operating room nurse, said it was important for reservists to deploy alongside active duty Sailors and medical staff. "There should be seamless integration. You need to train in the same platform. We have to train with the same equipment and set up." The reservists got a taste of the real Navy, something that can be hard to do working weekends at a shoreside hospital.

For CAPT Cindy Sweeney, NC, USNR, filling a billet aboard a hospital ship was one of her long-term goals. "There is definitely a difference be-



HMCN(SW) T. Webb

A chock-and-chain crew await the landing of a Russian-built MI-8 helicopter on *Comfort's* helo deck.

the crew with confidence and esprit de corps. It can develop the sense of 'we're in this together,' looking out for each other, taking personal pride and a sense of accomplishment. It can give the crew the sense of how they fit into the scheme of things, how the crew is part of the bigger picture, what the roles are, and that all roles are equally important."

The medical crew gained unique insights into downtime when rough seas precluded liberty ashore. Crew improvisation led to creative recreational games including tug of war and various relay races with international counterparts.

The professional and personal strengths of the Ready Reservists were key in responding to the wide array of circumstances and conditions during Operation Baltic Challenge. The opportunity to exercise these strengths serves to build the experiential base so essential for optimum readiness. These strengths have to be exercised in a way that doesn't compare with civilian experience.

The reservists who participated in Baltic Challenge provided essential advanced trauma resuscitation training for their active duty counterparts and enhanced the morale through their creative methods to alleviate boredom. □

tween filling an empty slot at a hospital and being out on the *Comfort*. At Bethesda during the Gulf War, it was just work, work, work in the OR. We never fully understood where our patients were coming from or what they had gone through. Here, I have a new awareness of a ship's environment: physical, emotional, psychological. It's important to understand those unique features when treating patients who

work in that environment. You have to tie things down—the OR table, IV poles, anesthesia cart, and crash cart. You become aware of the lack of privacy and personal space. You work on being tolerant of others because you're confined to the ship 24 hours per day." Sweeney reported new insights on leadership. "The impact of leadership on the morale of the crew is extremely important. It can infuse

CAPT Collins is attached to NR BUMED 106 and is Senior Policy Analyst, Office of Medical Affairs and Health Programs, TRICARE Management Activity, Department of Defense.

Great Hope Results in Great Comfort

JO1(SW) F.R. Keeley, USN

"I am writing to you in great hope."

These were the opening words in a letter from Lithuanian resident Tatjana Tvardauskiene as she asked for help for her son, who had a rare birth defect. USNS *Comfort* at anchor off Klaipeda, Lithuania, was participating in Baltic Challenge '98, an annual international military exercise involving 11 European nations and the United States.

Writing for her 13-year-old son, Vidmantas, Tatjana said, "My son was born on December 13, 1984, with a big tumor on the back of his head. Since that day my family and myself live in hope that God will [have] mercy [on] us and will not deprive us of the child."

According to CDR Ross Moquin, the neurosurgeon aboard *Comfort*, what Vidmantas had was a "lipomycolmingocele, or osseous horn" which is a growth that started before Vidmantas was born. This growth pushed out of his skull and continued to grow under his scalp, giving him a hornlike protrusion. Additionally, it caused a permanent tennis ball-sized hole in his skull and continued to grow as the boy matured, slowly creating internal pressure and pain. Fortunately, this condition is rare, but left untreated can have devastating and life-threatening effects.

Tatjana's letter neither begged or pleaded; rather she starkly outlined what the entire family had done to seek help for their son. But, between the lines a mother's love was abundantly clear, as was her heartbreaking and frustrating fight to save her son.

Vidmantas had been hospitalized 14 times. When he was 2 and again at 4, surgery was attempted and some of the growth was removed. But, both times Russian surgeons had to turn back because Vidmantas was losing too much blood. Since then, doctors from Lithuania to Moscow offered no encouragement and said they had done all they could. "Perhaps, in America . . ." they said with a shrug.

The years of care, worry, and frustration led to Tatjana's own failing health. Yet her letter ended with, "My son Vidmantas, though his head is deformed and the defect is visible, lives a happy and cheerful life. We explained to him that the bump on his head is just like glasses, dentures, or other things with other people. We taught him to ignore strange glances or words of other people. He still does not realize what is actually wrong with him, that his life is still in danger."

Tatjana dreamed every day, she said, of finding a way to get Vidmantas to America. It was just a dream, because going to America was out of the question. At first, because Lithuania was part of Russia. Then, after independence, it was just too costly.

Monday, 20 July, Tatjana read a story in her local newspaper about the American hospital ship *Comfort*, anchored near Klaipeda. Afraid to hope, she contacted the reporter, asking for more information. After hearing Tatjana's story, the reporter thought it was worth asking the exercise press information center for assistance. Although *Comfort* had been used only to treat military personnel involved in exercise Baltic Challenge, Tatjana was encouraged to contact the U.S. Embassy, which worked with *Comfort* to expedite the request contained in her letter.

Tatjana wrote the letter just as she had written other letters in the past. She knew the wheels of government in the past had worked very slowly, if at all. The ship would be gone, she thought, before she would get an answer and so would her son's chance for a normal life. At 13, he was beginning to experience trouble with his eyes and had constant sinus pain.

Thursday the Embassy called asking if she and Vidmantas could be in Klaipeda on Friday. The ship was leaving on Saturday, but the doctors would be able to see her son. Tatjana doesn't remember the frantic ride to Klaipeda, but she does remember the ride out to *Comfort*. "On the way out, the little boat rocked so much, and the

closer we got to the ship it got bigger and bigger. What a welcome sight."

Like any patients coming aboard *Comfort* there was no time to prepare themselves for the fast pace of a modern trauma hospital. But for Tatjana and poor Vidmantas they were hurled into what seemed like a maelstrom of activity.

First stop was sick bay, where they met CDR Ross Moquin, a neurosurgeon from the National Naval Medical Center (NNMC), Bethesda, MD. After a quick external exam and medical history along with vital signs, Moquin asked for permission to do a CAT scan. Tatjana agreed.

The CAT scan took only a short while and the results were fed into a state-of-the-art telemedicine computer where doctors could not only see the individual X-rays, but also a 3-D image of Vidmantas' head in great detail. At the same time, these same images were being sent by satellite to NNMC where CDR John Stockel, neurosurgeon on duty, studied them, consulted with Moquin, and concurred with his diagnosis and surgical plan.

Moquin then spoke with Tatjana, explaining that he could operate and help Vidmantas. He then explained each step of the operation and the risks. "Do you want me to operate?" "When?" she asked. "As soon as we can set it up . . . Now," he replied.

Tatjana's head whirled. For 13 years she had waited for this moment, only daring to dream that someday it might happen. Now this unknown American doctor, with warmth and confidence, said not only could he help Vidmantas, but wanted to help, and wanted to do it now. While Tatjana tried to catch her breath and collect her wits, lab tests were ordered for Vidmantas. Within minutes she made her decision. "Yes. Please, yes," she said.

There were many preparations to make. Moquin wanted a Lithuanian neurosurgeon to participate in the operation because Vidmantas would need followup care and Moquin



Following his dramatic surgery Vidmantas Tvardauskiene prepares for another visit with the CT scanner aboard *Comfort*.

wanted the physician to know the case from the beginning.

Gritksas Vitas, an American-trained neurosurgeon, was available in Klaipeda and readily agreed to help with the operation and do the followup care. As soon as he could arrive they would begin. Vidmantas was understandably frightened. Tatjana stayed by his side, soothing him with her touch and reassuring him in a low voice, as only a mother can. Moquin and Vitas bonded quickly, and soon began the surgery.

The operation was scheduled for 6 hours. It was slow and painstaking work. Moquin was guided by views of Vidmantas head on the computer monitor. Growths of this kind have many blood vessels and each one had to be sealed. Finally, all the

growth was removed leaving a hole that would be filled as the boy's brain resumed its normal shape. Blood that had escaped during the operation was suctioned off and run through a machine that cleaned it and returned it to his body. A plastic piece was fitted to cover the hole in his skull. Finally, the scalp was pulled back in place and stitched closed. The entire procedure took 7 hours but the doctors were satisfied.

Saturday morning, Tatjana was again by her son's side. Moquin wanted to keep Vidmantas for several days even though he said the real danger had passed. Meanwhile, *Comfort* prepared to set sail for Visby, Sweden, and a medical conference to be held there. Tatjana and Vidmantas traveled with the ship to Visby before returning to Lithuania.

A quest of great hope, covering 13 years and many heartaches, happily ended in great joy and great "comfort" aboard a U.S. Navy hospital ship able and willing to perform "miracles." □

JO1(SW) Keeley is assigned to the Public Affairs Office at National Naval Medical Center, Bethesda, MD.

Advances in Navy Pharmacy Information Technology:

Accessing Micromedex via the Composite Healthcare Computer System and Local Area Networks

LCDR Seth Koerner, MSC, USN
Frank Becker

The profession of pharmacy has long utilized technology to more efficiently and effectively bring healthcare to the patient. Navy pharmacy has embraced a plethora of technological advances in its day-to-day operations to include computers (specifically TRIPHARM, TMPS, and CHCS), fax machines, automated telephone prescription refill systems, tele-video systems, automated compounders, hand-held bar-code scanners, Internet-accessible prescription refill systems, automated on-site remote dispensing devices, and dispensing robots.

Pharmacy Evolves From Distribution to Direct Patient Care Functions

Evolving from the traditional role of compounding and dispensing specialists, pharmacists are becoming an important participant in an information-based, patient-care, team approach to healthcare. Pharmacists are leaving the traditional four-walls of the dispensing pharmacy to establish themselves as vital team members in direct patient care.

An important part of this evolution is the timely access to the most up-to-date information available. When rounding with an internal medicine team, counseling a patient in an ambulatory care setting, or answering the myriad of questions asked of them on a daily basis, pharmacists need almost instantaneous access to pharmaceutical information. Accurate and timely medication information is the

cornerstone in treating patients from the hospital bed to the home-healthcare setting.

Comprehensive Information Database: Micromedex

Micromedex (MDX), Incorporated (Denver, CO) is a company which has developed a number of computer CD-ROM-based full-text pharmacy, toxicology, emergency medicine, and patient education reference products. These products are commercially available for use on a subscription basis. MDX is a recognized gold standard with regards to total pharmaceutical information availability, and is upgraded on a quarterly basis.

Limitations of Micromedex Within Navy Pharmacy

MDX is utilized by pharmacies at numerous Navy military treatment facilities (MTFs), and their branch clinics, located worldwide from Sicily to Japan; Iceland to Cuba. Historically, Navy MTFs have purchased stand-alone MDX subscriptions that were located in the main pharmacy spaces, isolated pharmacy satellites, and in emergency rooms. While the MDX product contained invaluable information, its *accessibility* by other healthcare providers, including pharmacy personnel, was limited. Navy corpsmen, nursing personnel, and physicians were typically unable to access the MDX system, and often, a pharmacist needed to walk from the telephone or front-line

window to another area within the pharmacy in order to access MDX.

Some activities took the initiative to implement network versions of MDX to eliminate some of the problems associated with the use of individual copies. In June 1997, for example, the pharmacy department at Naval Hospital Jacksonville, FL, implemented a local area network (LAN) version of MDX within their facility and outlying branch clinics capable of supporting 12 concurrent users. This worked well for in-house users of MDX.

Composite Healthcare Computer System

Beginning in the late 1980's, the Navy embarked on transitioning from the traditional hard-copy paper medical-delivery system (e.g., lab chits, prescriptions, paper memos) to an integrated healthcare-delivery computer system. This conversion was accomplished via the Composite Healthcare Computer System (CHCS). CHCS allows the provider to enter a prescription or a lab order directly into a microcomputer or computer terminal located in his or her office or on the ward. CHCS "dumb terminals" were placed in a multitude of strategic places in all Navy MTFs including the pharmacy, most physician offices, laboratories, administration spaces, nursing stations, etc.

Fusion: MDX and CHCS

In FY96, Naval Medical Information Management Center (NMIMC), initiated the Telelibrary Project in conjunction with the Bureau of Medicine and Surgery (BUMED) and the Director, Navy Medical Library Program. The primary goal of the project was to use available technology to provide increased end-user access to the bibliographic citations and full-text articles which are available in medical and dental reference sources. The Telelibrary Project team is constantly searching to find suitable reference materials which can be incorporated as part of the project services.

Separately, LCDR Vic Powell, NMIMC, San Diego Detachment, obtained a proposal from MDX to provide a claimancy-wide subscription to a number of the full-text MDX database modules. The subscription proposal was submitted as a method to increase the availability of MDX databases within the Navy Medical Department, including providing support to users who only have access to CHCS terminals. Since the MDX modules are excellent reference sources for pharmacy and toxicology information, it was determined that this initiative could best be implemented by including it under the Telelibrary Project umbrella.

Mr. Frank Becker, Infrastructure Integration and Planning Department, NMIMC, arranged with MDX to test the software on a demonstration server and verify that connectivity was possible from CHCS terminals. A system test was conducted from September to December 1996. HM1 Bobby Norman (Ret.) coordinated the test effort and arranged for users from multiple sites to try the system. The test was determined to be successful, and NMIMC initiated a procurement action to purchase a 1-year trial MDX subscription. The procurement was completed and the subscription took effect on 30 June 1997, effective to run a year until 29 June 1998, at a cost of approximately \$84,300, funded by NMIMC.

Hardware and Software Specifics

The system hardware platform is a COMPAQ Proliant 5000R server with four Pentium 166 Mhz processors, 128 MB of RAM, and 16 GB of disk storage. The operating system is the SCO UNIX Openserver Release 5.0.4 with the symmetrical multiprocessor (SMP) option. The system can support up to 100 simultaneous user sessions.

System Access and Printing Limitations

There are some current limitations associated with the use of the MDX system. For example, CHCS users have to exit out of CHCS and log in again to MDX. Also, a potential user must have access to a LAN in order to access MDX through a PC. Distant users of MDX via CHCS (overseas for example) have reported that the accessing time to enter the MDX program has been greater than anticipated.

Another limitation involves printing reports from the MDX system. Unfortunately, MDX printing is not yet supported on the CHCS character printers which are connected to terminal servers. However, other printing options do exist. They include printing to a printer which is directly connected to a PC, printing to a MED-OA network printer which is accessed from a PC, printing to a network-addressable laser printer with JetDirect card which supports the TCP/IP protocol, and printing to a printer directly connected to a CHCS terminal.

Network-addressable laser printers have been installed at many activities to support CHCS users. Other network-addressable printers are available under the Clinical Information System (CIS) and Ambulatory Data System (ADS) projects. However, despite these limitations, the overall increased access of MDX has been very positively received by the international Navy pharmacy community.

Other Implementation Parameters

Facilities are receiving the following benefits from the Navy field trial:

- Unlimited access to all of the MDX modules which are included in the Navy field trial subscription at no cost to the MTF.
- Users who did not have a current MDX subscription are able to access MDX. No additional purchase is necessary for MTFs to access this expanded service.
- The MDX service is available to both PC and CHCS terminal users.

The MDX trial subscription is available to each naval medical center, all naval hospitals, naval clinics, naval dental centers, the HSOs, and to the echelon three mission-specific activities. Additionally, network-connected branch clinics of any of the aforementioned activities are able to access the MDX system. Army and Air Force sites are not part of the initial Navy trial, although a triservice MDX/NMIMC trial has been discussed.

Naval MTFs are not allowed to cancel or decline to renew current MDX contracts for the life of the trial subscription. This restriction will be revisited with MDX when it becomes time to renew the subscription.

Advertising the System

Information was distributed by Mr. Becker and LCDR Koerner through a variety of mechanisms. Mr. Becker distributed instructions to all appropriate facilities via E-mail. MTFs were encouraged to have an appropriate Management Information Department (MID) professional contact him regarding setting up an account. At 30 days post-implementation, LCDR Koerner contacted the appropriate pharmacy department heads via E-mail and/or telephone of those pharmacy activities not yet connected to ascertain their knowledge of the system and implementation intentions.

Mr. Becker constructed a comprehensive MDX Frequently Asked Questions (FAQ) page on the Internet located at address <http://www-nmimc.med.navy.mil/telelibrary/mmdxfaq.htm>. This address was later put on the Navy Pharmacy Internet homepage by the Navy pharmacy specialty leader. The Navy pharmacy specialty leader also disseminated all information found on the FAQ page via his monthly pharmacy factoids, a publication sent out to all Navy pharmacy activities worldwide.

LCDR Koerner advertised the system via the NNMC pharmacy newsletter, at morning departmental quarters, and through a step-by-step instruction sheet afforded to the pharmacy staff at NNMC. LCDR Koerner also spoke to the medical students, interns, and residents when he

rounded with the internal medicine teams regarding the MDX system.

Mr. Becker established a MicroMedex trial subscription usage statistics web page (<http://www-nmimc.med.navy.mil/telelibrary/mxaccess.htm>) which features a weekly tabulation of the MDX/CHCS usage.

Conclusion/Outlook

The MDX/NMIMC trial has shown that use of existing technology can be used to further enhance patient care and greatly augment provider information access. Costs have been minimized while access to this valuable information tool has been greatly improved. Pharmacist response has been well received and other healthcare providers who have accessed the system continually comment on the value this new information tool affords them. Renewal of the MDX subscription will depend on the availability of future funding, as well as the level of usage. NMIMC intends to maintain the subscription if funds are available and the level of usage shows that this resource is being actively and effectively used.

Other questions to be resolved include:

- Does expansion of MDX via CHCS meet Navy pharmacy's mission? Does it add value to our services? Did the searchers find what they were looking for? Was the information found of sufficient value to effect a change to a patient's treatment?
- Where will future funding be derived from? (centralized versus decentralized)
- Are individual MTF LAN versions of MDX a more reasonable feasible alternative to the MDX/NMIMC project?
- To control costs, all MTF stand-alone contracts should be converted to the MDX/CHCS contract. Is this a viable option?
- What future does a triservice MDX/NMIMC program hold?

Future dialogue and feedback from Navy MTF pharmacies will provide answers to these and other questions in the near future. MDX access via NMIMC represents another milestone in the ever-advancing use of technology by Navy pharmacy. □

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The Development and Refinement of Naval Health Services Doctrine

LT Maurice Morales, MSC, USNR
CAPT Edward P. Wyatt, MSC, USN

If you mention the word “doctrine” in mixed company, it usually evokes one of two predictable responses: either your listeners’ eyes will begin to glaze over from fear of incomprehension or they will quickly try to change the subject to something more “interesting.” One of the best-kept secrets in the Navy is that doctrine is actually understandable by the average Sailor and Marine, and more importantly, relevant to everything we

do as a uniformed service. This is especially true in Navy medicine, where many decisions can have a major impact on life and health. What makes this an exciting time to revisit the subject of naval health services doctrine is the opportunity to shape the way Navy medicine will fulfill its readiness mission into the 21st century.

This article is the first in a series on naval health services doctrine which

will appear in *Navy Medicine* over the next year and a half. While this article will provide a general overview of the background, process, and participants involved in current doctrine development, future articles will provide updates on the progress being made and will also preview draft doctrinal publications. By the end of the series in late 1999, doctrine may actually be a hot topic of conversation.

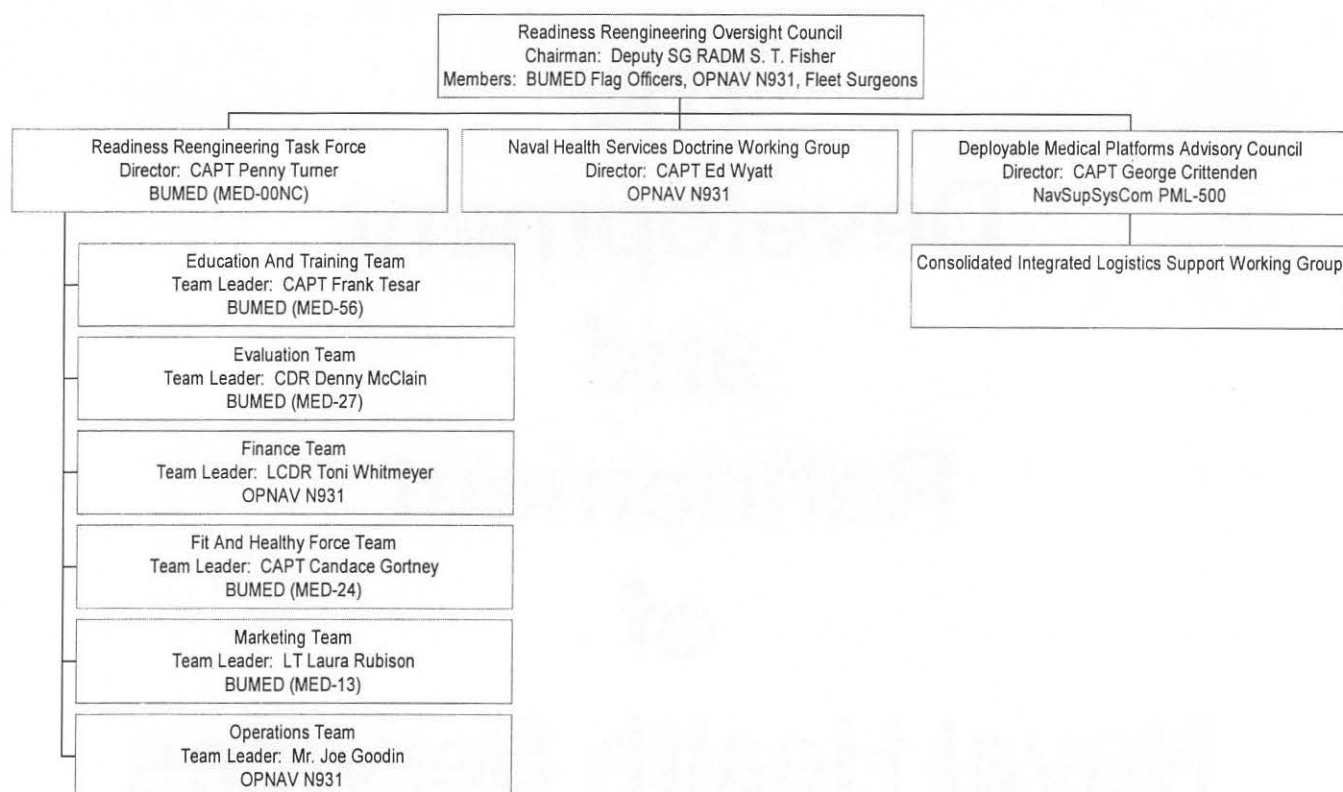


Figure 1

Historical Background

As with many of the military's current initiatives, Navy medicine's readiness reengineering plan has its roots in the end of the Cold War and the shift in threat scenarios from global warfare to major theater wars (MTWs). Coincident with this shift in focus, Navy medicine initiated a reassessment of requirements and capabilities which resulted in the development of the Total Health Care Support Readiness Requirements model (THCSRR) and the Readiness Alignment Plan (often referred to as the Galactic Radiator). In 1997, then Navy Surgeon General VADM Harold M. Koenig established the Readiness Reengineering Oversight Council (RROC) and the Readiness Reengineering Task Force (RRTF). As Figure 1 illustrates, the Task Force was established as an

action officer level matrix organization supporting day-to-day reengineering efforts, while the Council provides flag oversight of the entire effort.

In addition to the RRTF, the RROC also chartered two additional groups that play a vital role in refocusing Navy medicine toward readiness, the Deployable Medical Platforms Advisory Council (DMPAC) and the Naval Health Services Doctrine Working Group (NHSDWG). The DMPAC's purpose is to review and comment on proposals from the RROC that specifically impact deployable medical platforms such as the fleet hospitals and hospital ships. The Doctrine Working Group's function is to guide the development and refinement of doctrine for the establishment, deployment, and employment of

health service support platforms in support of naval forces (see Figure 2).

After a preliminary organizational meeting in December 1997, the Doctrine Working Group convened for its "kickoff" conference on 24 and 25 Mar 1998 at the Naval School of Health Sciences, Bethesda, MD. The 30 participants represented diverse experiences and viewpoints, including Reserve Component, Fleet, and Marine Force perspectives. The Army, Air Force, Coast Guard, and Joint Staff were also represented. Representatives from the Navy Warfare Development Command (CAPT William Schmidt, SC; CAPT Robert Miller, MSC; and LCDR Rick Reed, MSC) and the Marine Corps Combat Development Command (LCOL J.D. Brown, USMC; and LT Bill Miles, MSC) provided background and guid-

Charter

NAVAL HEALTH SERVICES DOCTRINE WORKING GROUP

Mission. The Naval Health Services Doctrine Working Group (NHSDWG) will work in conjunction with the Navy Warfare Development Command (NWDC) and the Marine Corps Combat Development Command (MCCDC) on development of doctrine and selected tactics, techniques, and procedures for the establishment, deployment, and employment of health service support platforms in support of naval forces.

Organization. The Working Group will function under the leadership of a Director with active and ad-hoc members. Head, Medical Plans and Policy Branch, Medical Resources, Plans and Policy Division, Chief of Naval Operations (N931D) will serve as Director. Active membership will be as follows:

Representative from N931C
Representatives from HQMC (HS) and MCCDC
Representative from Navy Warfare Development Command
Representatives from Offices of the Fleet Surgeons
Representatives from Marine Force Commanders (SGN)
Representative from BUMED (MED-27)
Program Manager, Fleet Hospitals (PML-500)
Program Manager, Hospital Ships (MSC)

Ad hoc members will be:

Representative from each Medical Department Corps
Representative from NAVMEDLOGCOM
Representative from COMNAVRESFOR
Representative from MARFORRES
Representative from JCS (J-4 /MRD)
Observers from USA, USAF, USCG as desired

Scope of Work. The focus of the Working Group will be deployable medical platforms (people, equipment, and supplies) beyond those organic to the operating forces. The Working Group will address augmentation medical forces for operational units including Marine Forces, large deck amphibious ships, and other units identified in the Navy Capabilities and Mobilization Plan (NCMP). The Working Group will be guided by the general principles delineated in Joint Publication 4-02, Doctrine for Health Service Support in Joint Operations.

Process. The Working Group will propose Health Service Support (HSS) doctrine and associated tactics, techniques and procedures to the Readiness Reengineering Oversight Council (RROC). With concurrence by the RROC, the Working Group will submit proposals to NWDC and MCCDC, as appropriate, to ensure a seamless application of HSS doctrine across the Navy and Marine Corps.

Active members of the Working Group will meet as required using video teleconferencing (VTC) to the extent possible. There will be formal meetings at least twice a year. Ad hoc members will be notified of all meetings and will be free to attend if they choose. They will be specifically invited to attend when issues in their area of expertise are on the agenda for discussion, and at the semiannual meetings.

Product. The Naval Health Services Doctrine Working Group will produce naval health services support concepts and doctrine to drive development, and guide planning for deployment, and employment of health services support platforms (personnel, equipment, and supplies) across the operational spectrum. These concepts will support operations consistent with JCS Vision 2010, the Naval Operational Concepts, and Operational Maneuver from the Sea.

Figure 2

Doctrine Development Process

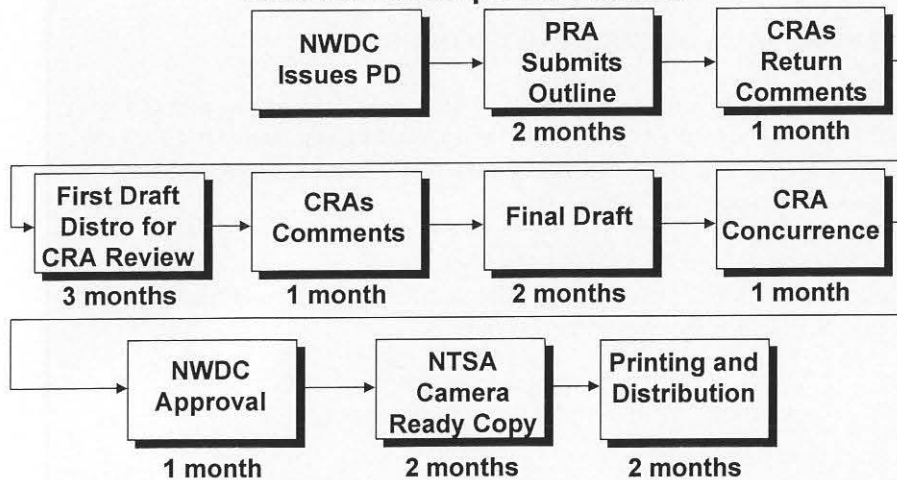


Figure 3

ance on the doctrine development process. Working Group members literally rolled up their sleeves and seized the opportunity to revitalize the naval health services doctrine development process. After reviewing the lessons learned from our sister services, the Working Group broke up into smaller groups to draft Program Directives, the first step in a process that ultimately culminates in a new Naval Warfare Publication.

Doctrine Development Process

The development of doctrine falls under the purview of the Navy Warfare Development Command (NWDC) in Newport, RI, (formerly the Naval Doctrine Command in Norfolk, VA). CAPT Schmidt, head of Logistics Doctrine, and CAPT Miller, head of Logistics Concepts, are playing an instrumental role in guiding the Doctrine Working Group.

As Figure 3 illustrates, the process is designed to be very collaborative and interactive. The Working Group has proposed eight separate publications that will update or replace current doctrinal publications. The main goal is to produce doctrinal publications that are relevant, easy to under-

stand, and of practical use at sea and ashore.

The Doctrine Working Group is not charged with actually writing doctrine, but rather with facilitating the identification of commands that serve as Primary Review Authorities (PRAs), Coordinating Review Authorities (CRAs), and Technical Cognizance Offices (TCOs). Navy Warfare Development Command issues the Program Directive and officially assigns the various command responsibilities. The PRA takes the lead in coordinating, researching, and writing the assigned publication. The PRA may tap expertise both in and outside of its own organization (contributing commands). The first step is to produce a draft outline of the publication for CRA review. After a 30-day review and comment period, the CRAs return the marked up outline to the PRA. Within 60 to 90 days after that, the PRA distributes a first draft of the publication to the CRAs, which again have 30 days to review and comment on the document. Thirty to 60 days after receiving and incorporating these comments, the PRA distributes a final draft for concurrence by the CRAs. Final approval from NWDC is ex-

pected 30 to 60 days after this period. The total process is expected to take between 14 and 18 months, depending on the specific publication. While this is a relatively ambitious schedule, it will be made easier by the fact that NWDC will be intimately involved in the development of the publications.

Because of the importance of the subject matter to the Marine Corps, the Doctrine Working Group adopted the unique objective of having some of the publications dually designated as Naval Warfare Publications and Marine Corps Warfare Publications. Thus, the Marine Corps Combat Development Command (MCCDC) will be actively involved as a CRA for the publications, coordinating the Marine Corps review and input within the same timeframes described above.

Publication Architecture

One of the most important decisions made by the Doctrine Working Group at its conference was how to best subdivide and organize the broad subject matter of operational health service support. Starting with a draft architecture provided by NWDC, the Working Group added an eighth publication entitled Combat Stress Control, and recommended the library shown in Figure 4. This figure also identifies the PRA, CRAs, and the TCO for each publication. In keeping with doctrine development protocol, the Office of the Chief of Naval Operations, Medical Resources, Plans and Policy Division (N931) was designated as the TCO for all of the publications by virtue of being the resource sponsor for Navy medicine.

Conclusion and Next Steps

The Naval Health Services Doctrine Working Group successfully completed its agenda. The Working Group developed and drafted program directives for six NWP:

NWP 4-02 Series Publications

NWP	PRA	CRA	TCO
4-02 Naval Force Medical Protection	OPNAV (N931)	FltCINCs; COMNAVRESFOR	OPNAV (N931)
4-02.1 Navy HSS Logistics	NAVMEDLOGCOM	FltCINCs	OPNAV (N931)
4-02.2 Patient Movement	BUMED (MED-03); MCCDC	FltCINCs; MSC; BUMED; N931	OPNAV (N931)
4-02.3 Navy HSS Doctrine For MOOTW	OPNAV (N931)	FltCINCs; USCG	OPNAV (N931)
4-02.4 Fleet Hospitals	NavSupSysCom (PML-500)	FltCINCs; COMNAVRESFOR	OPNAV (N931)
4-02.5 Marine Corps HSS Operations	MCCDC; NWDC	Publication Completed	Publication Completed
4-02.6 Hospital Ship HSS Operations	COMSC (PM1H)	FltCINCs; MSC; COMNAVRESFOR; BUMED; MARFORs; Hospital Ship MTFs	OPNAV (N931)
4-02.7 Combat Stress Control	OPNAV (N931R1)	BUMED; HQMC (HS)	OPNAV (N931)

Figure 4

- 4-02 Naval Force Medical Protection
 - 4-02.1 Navy Health Service Support Logistics
 - 4-02.2 Patient Movement
 - 4-02.3 Navy Health Service Support Doctrine for Military Operations Other Than War
 - 4-02.4 Fleet Hospitals

*NWP 4-02.5 Marine Corps Health Service Support Operations is a reprint of Marine Corps Warfare Publication 4-22, Health Service Support Operations. MCWP 4-22 has been approved by MCCDC for reprint and distribution within the Navy Doctrine Library. MCCDC remains the PRA and sponsor for the publication.

- 4-02.5 Marine Corps Health Service Support Operations*
- 4-02.6 Hospital Ship Health Service Support Operations
- 4-02.7 Combat Stress Control

Early in the spring of 1998, the PDs for six of the publications listed above were issued via naval message. The PD for NWP 4-02.7 Combat Stress Control, currently under development by a team led by a Selected Reserve member of the Chief of Naval Operation's staff (OPNAV), was released shortly afterward.

At the various commands listed in Figure 4, the process is now under

way to assemble subject matter experts and authoritative references to put in writing the doctrinal guidance that Navy medicine will rely on in the future to better accomplish its readiness mission. And with readiness being "true north" in Navy medicine, doctrine could hardly be a more timely or relevant topic of conversation! □

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The Zone: Dietary Cure-All or Junk Science?

LT Leslie Cox, USN
LT Kim Zuzelski, USN

For those of you looking for a way to optimize athletic performance or lose weight, chances are you've heard of a book called *The Zone* (Reagan Books, 1995) by Barry Sears, Ph.D. *The Zone*, and similar programs promote a high-protein diet regimen of 40 percent carbohydrate (CHO), 30 percent protein, and 30 percent fat (also known as a 40/30/30 diet). Claims have been made that this recommended diet enhances athletic performance and promotes body fat loss. The author also claims that if you follow the Zone diet, you'll be winning the fight against a variety of disease states.

The American College of Sports Medicine, the American Dietetic Association, the Women's Sports Foundation, and the Cooper Institute for Aerobics Research have released a joint statement saying that high-protein plans are neither the answer for weight loss nor for athletic performance and can cause harm. With patients and health professionals alike singing the praises of "zoning," we

feel *The Zone* needs a closer look. This article will explore some of the claims made in *The Zone* with respect to weight loss but will primarily focus on athletic performance.

Weight Loss

As a weight loss diet, the Zone's 40/30/30 combination has not been scientifically proven to be effective. Dr. Sears claims that excess dietary carbohydrate aggressively promotes the accumulation of body fat by increasing insulin levels, which supposedly tell the body not to release any stored fat for immediate energy use. The Zone diet supposedly lowers insulin levels thereby maintaining insulin in a specified therapeutic zone (which he believes should be maintained for a lifetime).

Dr. Sears claims that all dietary carbohydrate (in excess of 40 percent) is automatically converted to body fat. However, studies have shown that humans overfed with CHO store 15-25 percent less fat than those overfed from fat.(1) This demonstrates

the body's astounding ability to alter metabolism to accommodate a few extra calories.

Lean et al. compared the use of a high-carbohydrate diet (58 percent CHO) and a low-carbohydrate diet (35 percent CHO), both using a 1,200 calorie weight reduction diet in obese women.(2) Blood pressure did not change and neither diet resulted in consistently more weight loss. Of course, too many extra calories from any nutrient can be converted to body fat. If Dr. Sears' claim were true that "carbohydrates make you fat," we would see much more obesity in countries such as Italy, Japan, and China (where pasta and rice are staple foods).

To further fuel the carbohydrate scare, Dr. Sears contends that the best way to fatten cattle is to feed them excessive amounts of low-fat grain; therefore, the best way to fatten humans is to feed them excessive amounts of low-fat grains, which come in the form of bagels and pasta. (He also points out that pasta consumption

has increased 115 percent in the last decade.) To make the conclusion that Americans are getting fatter because pasta sales have increased is illogical, simplistic, and without merit. Furthermore, Dr. Sears blames CHO for our expanding waistlines, yet ignores the fact that Americans have become a nation of couch potatoes.

Dr. Sears states that "data" shows "the American public has dramatically cut back on the amount of fat consumed," yet the rates of obesity in the United States continue to increase. The fact is, Americans have *not* decreased their fat intake, although *the percent of calories from fat* has decreased (41 percent in the early 70's to 35 percent currently), which gives the impression Americans are eating healthier.

According to the most recent food consumption surveys, Americans are still eating comparable amounts of fat, but the total caloric intake has increased by 100-200 calories per day which can account for the concurrent increase in obesity.(3)

Athletic Performance

Dr. Sears claims that athletes who eat a Zone-favorable diet (40/30/30) will reach their maximum athletic performance, and elite athletes will be breaking world records like never before. He touts that his regimen was responsible in the turn around of Stanford University's Women's swim team after years of losses to the University of Texas. He fails to mention that the Texas coach and several athletes of national caliber transferred to Stanford prior to their winning streak. To further evaluate the performance and health claims of *The Zone*, a review of the function and formation of eicosanoids is necessary.

Among other actions, eicosanoids promote blood flow to the site of in-

flammation, and stimulate the breakdown of fat and protein for energy in injured tissue.(4) According to advocates of the 40/30/30 diet, there are "good" and "bad" eicosanoids. The "bad" ones supposedly impede athletic performance by reducing oxygen transfer to the cells which in turn interferes with body fat utilization. They also claim that by lowering insulin levels, fewer "bad" eicosanoids will be generated.

It is true that the production of various eicosanoids may be manipulated by the type of dietary fat consumed, since some eicosanoids are synthesized from essential omega-6 (found in plant sources) and some are from omega-3 fatty acids (found in fish oils).(5)

However, there is no scientific evidence that the 40/30/30 diet alters eicosanoid production as stated. In addition, synthesis of eicosanoids is governed by the autocatalytic pathway of cyclooxygenase, meaning that the enzymatic pathway automatically "shuts off" eicosanoid production. This reminds us that the human body regulates itself despite our efforts to reprogram it.

Other experts concur that conclusions drawn by Dr. Sears are oversimplified. Dr. Gerald Reaven, MD, a professor at the Stanford University School of Medicine (whose life work has been studying the effects of insulin on the body) says, "I find it hard to swallow that anybody could really believe eicosanoids are the key to all health and disease. The body isn't that generic. One thing can't have an effect on everything else."

William Evans, Ph.D., director of Penn State University's Noll Physiological Research Center, agrees; "There aren't any studies that I'm familiar with that suggest they're dangerous in *any way*. Anyone who tries to sell diet as the key to stem-

ming "bad" eicosanoid production is capitalizing on an unfounded idea."

Dr. Sears' claim that insulin has a detrimental effect on athletic performance due to inability to fully utilize fat stores is simply unfounded. The release of catecholamines (i.e., epinephrine, norepinephrine, glucagon, etc.) during training increase the glucagon-to-insulin ratio thereby favoring lipolysis and glycogenolysis. Individuals who exercise regularly have reduced fasting levels of insulin and also exhibit a reduction of these hormones following a carbohydrate load.(6) Although a high insulin-to-glucagon ratio favors lipogenesis by signifying a well-fed state, net fat storage and weight gain will not occur if caloric intake does not exceed expenditure.

Decreasing CHO intake to the extent recommended in this diet is likely to hamper glycogen synthesis and storage, and may be ketogenic if adequate caloric intake is not maintained. Carbohydrates are digested and absorbed more rapidly than protein or fat which makes it the most efficient energy source available, especially during high-intensity training above 70 percent aerobic capacity.

A recent study compared glycogen synthesis in athletes on a 40 percent CHO diet versus a 70 percent CHO diet during repeated days of 2-hour workouts. It was concluded that the 40 percent CHO diet had significantly depleted glycogen stores in their subjects to 15-20 mmol/kg which was a point at which they couldn't continue to exercise at even a moderate intensity. The 70 percent CHO diet, however, maintained glycogen stores above 100 mmol/kg and the athletes were able to continue high-intensity training for the duration of the exercise periods.(7)

Glycogen depletion is also responsible for some claims of weight loss. The "last few pounds" that testimoni-

Daily dietary requirements for LT Joe Eldred:

175.0 : Weight - pounds
76.0: Height - inches
32.0: Waist - inches
6.5: Wrist - inches
155.0: Lean Body Mass - pounds
11: Body Fat - percent
140: LBM x activity factor (0.9)
140: Daily protein requirement - grams
20: Daily protein block requirement - blocks

	Breakfast	Lunch	Snack	Dinner	Snack
Protein:	5	5	2	5	3
Carb:	5	5	2	5	3
Fat:	5	5	2	5	3

Sample Menu (using Food blocks):

P = Protein block

C = Carbohydrate block

F = Fat block

als say was lost while on the 40/30/30 diet may not be fat loss which was assumed and/or desired, but rather the loss of water that accompanies glyco-gen depletion.

High-protein meals may also increase the risk of heat injury for athletes. It is not unreasonable to question the adverse impact on athletic performance in hot weather. When utilized as fuel, excessive protein causes diuresis that increases the risk of dehydration; this is always a concern for the athlete. Because excess amino acids cannot be stored, the urea generated from their metabolism must be excreted in the urine. In addition to the loss of valuable electrolytes, vitamins, and minerals, 50 ml of water is lost for every gram of urea excreted.(8)

Case Study

LT Joe Eldred is a 27-year-old who runs an average of 60 miles a week and has a marathon personal record of

3 hours 21 minutes. Joe told us he had read something about the 40/30/30 concept in running magazines but had never tried it. He agreed to let us plan a Zone-favorable diet for him.

Using Dr. Sears' formula, we calculated Joe's body fat at 11 percent, which is typical for a distance runner. We chose an activity factor of 0.9, which is for very active individuals; the description given in *The Zone* is "exercising 5 days a week, 2 hours a day." Lean body mass multiplied by the activity factor gave the daily protein requirement of 140 grams which is equivalent to 20 protein blocks. Because the Zone diet requires a 1:1:1 ratio of protein, carbohydrate, and fat, Joe will require 20 blocks of each. Our analysis of Joe's diet using Dr. Sears' formula reveals a mere 26-kcal/kg/ body weight (BW).

Recommendations for athletes or individuals who need to gain weight are normally 35-40 kcals/kg/BW. Total carbohydrate in grams provided by

this diet at 2.4g/kg/BW are also far below current recommendations of 7-8 g/kg/BW and may cause the production of ketone bodies. Protein levels are more than adequate at 2.31 gm/kg/BW. Unfortunately, since the total calories are so low, much of the protein will most likely be converted to CHO instead of being utilized for tissue repair and growth. It should be noted that while 140 grams of protein was Joe's protein requirement, analysis of the daily menu using nutrition analysis software (Nutritionist IV) revealed a significantly higher protein content of the menu at 183 grams of protein.

Dr. Sears contends that the Zone diet should not be confused with the high-protein, ketogenic diets of the 1970's; however, our analysis reveals this is just another version of a high-protein, low-carbohydrate diet. Clearly, the Zone diet using Dr. Sears' formula is inadequate, and possibly harmful for an athlete. Dr. Sears dismisses currently accepted nutrition research, comparing it to "twelve blind-folded people trying to describe an elephant."

Interestingly, when critics question the Zone principles, Dr. Sears counters their arguments by referring to selected studies of the same nutrition researchers he mocks. In *The Zone*, Dr. Sears describes the results of a pilot study he conducted in 1992 on the 40/30/30 diet which validates the success of this diet for fat loss. This study has not been published, nor has Dr. Sears published any nutrition research studies in referred scientific journals.

Conclusion

While the science behind the 40/30/30 concept can be faulted on many fronts, what cannot be disputed are the many testimonials from clients who have lost weight following *The*

Sample Menu

Breakfast:

3/4 cup Egg substitute	3P
1 cup Milk, 1%	1P, 1C
1 oz. Cheese, low-fat	1P
1 Orange	2C
2/3 cup Oatmeal (cooked)	2C
2 tsp. Almond butter	4F
6 Peanuts	1F

Lunch:

1 cup Milk, 1%	1C, 1P
6 oz. Turkey breast, deli style	4P
1 slice Whole-wheat bread	2C
2 Tomatoes	1C
1/2 Apple, raw	1C
2 tsp. Mayonnaise, low-fat	2F
18 Peanuts	3F

Snack:

*1 ZonePerfect Bar™	2P, 2C, 2F
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Dinner:

1-3 oz Chicken breast, skinless	3P
1/2 cup Cottage cheese, low-fat	2P
1 cup Broccoli, cooked	1C
2 cups Spinach salad	2C
1-2/3 tsp Olive oil	5F

Snack:

*1-1/2 ZonePerfect Bar™	3P, 3C, 3F
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Analysis:

Total Calories:	2112
Protein (gms):	186.6
Carbohydrate (gms):	190.5
Fat (gms):	72.3

* ZonePerfect Bar is a trademark of Eiotech Corporation. 1 bar=2 Protein, 2 Carbohydrate, and 2 Fat blocks. Each bar contains 19 essential vitamins and minerals, and Omega-3 fatty acids. The company literature states "The ZonePerfect Bar is the ideal Zone meal replacement or Zone snack for those times when you can't make a zone meal." Cost: \$1.97 per bar.

Zone. As dietitians, we believe that any diet that causes clients to be aware of their eating habits (portion sizes, fat content, not skipping meals, etc.) can improve dietary outcomes. It may not be the nutrient composition that is causing weight loss, but rather

the decrease in calories that comes with a closely monitored dietary intake.

Sound nutrition recommendations are those that have been established using scientific method. Until a double-blind, peer-reviewed study evaluates

the efficacy of the 40/30/30 diet, Navy health professionals should not endorse or advocate this diet for their patients.

Current recommendations for optimal athletic performance are a diet with high carbohydrate (60-70 percent), moderate protein (15-20 percent), and low fat (15-25 percent). While calorie reduction is essential in the treatment of obesity, it is clear that valid, long-term nutrition intervention studies are still needed to identify the optimal nutrient composition for weight loss and other disease states.

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Steamin' With the Army

LCDR Charles Patterson, DC, USN

The air was filled with the strains of "Anchors Away" and "The Army Song," the ribbon was cut, and a new future began for military dental research on 17 April 1998. It's full speed ahead with the co-located Naval Dental Research Institute (NDRI) and U.S. Army Dental Research Detachment (USADR), Great Lakes, IL. Dr. John Zapp, the executive director of the American Dental Association, gave the keynote address.

The Great Lakes Naval Training Center (NTC) is the largest naval training complex in the world. The base includes 1,153 buildings on 1,628 acres with over 50 miles of roadway. It is the home to 19 of the Navy's technical service schools, as well as the only Naval Recruit Training Command. Almost 50,000 Navy recruits complete boot camp at Great Lakes every year.

A dental research facility was established in 1948 as part of the dental department of NTC Great Lakes. In 1967, the NDRI was established as a separate command. It occupied spaces in Building 1-H, a historic building on the medical campus grounds. First erected in 1911, Building 1-H served as the base hospital from 1911 until 1960.

In 1988, a Detachment of NDRI was established at the National Naval Dental Center, Bethesda, MD, to support cooperative research with the National Institutes of Health, National Institute of Dental Research, and National Institute of Standards and Technology. In accordance with the Department of Defense's base realig-

ment program (BRAC 91), the USADR moved to NTC Great Lakes from Walter Reed Army Medical Center in Washington, DC. After 7 years and \$6.7 million, the renovation of the interior of Buildings 1-H, 43-H, and 14-BH, NDRI and USADR have just occupied their dramatically improved facility.

NDRI and USADR now share a state-of-the-art, 72,000-square-foot research facility, making it one of the largest dental research facilities in the United States. The combined military dental research organizations have departments dedicated to research, development, testing, and evaluation in the areas of dental materials, microbiology, immunology, dental investigations, chemistry, pathology, and dental sciences.

While each service has its own taskings, the list of cooperative projects is growing. In the area of field logistics, for example, USADR has developed a portable dental field unit with a dramatically reduced power requirement. The importance of continually reducing field power requirements and bulk cannot be overstated. Large generators require more support personnel with supplies and produce a large electromagnetic signature which can be detected by enemy forces.

USADR is also developing new electric field dental handpieces, reducing the need for compressed air for the dental unit from 40 liters per minute to a scant 23 milliliters per minute. The small air tank can even be re-

filled with a bicycle pump! Handpiece batteries are recharged with a notebook-sized solar panel.

As a complement, the Navy is beginning to develop a spring-powered, wind-up amalgam triturator to mix filling materials, resulting in another reduction in power demand, size, and weight. A newly developed portable X-ray unit may be held in one hand and will take digital X-rays that can be stored on a laptop computer with patient records. No more bulky X-ray developers, chemicals, and paper records to transport to and from the field. NDRI is also beginning to transfer technology developed for the removal of mercury from dental waste water in large military dental clinics to the small field dental units. This technology will also benefit small clinics and dental departments afloat.

On today's battlefield, those forces possessing greater on-hand information and education will carry the day. NDRI has produced an educational, interactive CD-ROM that integrates fully with telemedicine. It provides Army medics and Navy independent duty corpsmen with a mobile decision support system, and includes video clips of treatment procedures, oral pathology slides, and treatment recommendations. Called the "DDS/DMD" system, it is being introduced to both the Army and Navy. Also on CD-ROM is the "ImageQuiz" tutorial program to educate dental officers in the dental classification system.

NDRI's information systems applications program extends to include the CNO's "PIC" (personal information carrier) card project. NDRI is coordinating the incorporation of basic dental treatment needs data on the card and the development of an interface with this electronic "dental record." The interface uses off-the-shelf touch-screen technology in a 10-inch by 6-inch palm computer that is 2 inches thick. Dental data will be stored on a chip imbedded within each servicemember's card. In the field the card is merely inserted in the unit to pull up X-rays and a full medical and dental history. Hard copies for inclusion in the paper dental record may be printed if desired.

Quick and efficient detection and prediction of dental diseases are the goals of our microbiology and immunology

departments. Three rapid salivary diagnostic kits for the detection of decay-causing bacteria and the proteolytic enzymes which contribute to periodontal destruction are currently undergoing clinical trials. These tests are essential components of the Navy's new approach to dental care delivery, and will contribute significantly to the quality of care rendered to servicemen. Those at risk for developing oral diseases or conditions which reduce operational readiness may be identified more quickly and painlessly. The military labs are among the few in the United States capable of making monoclonal antibodies to spirochetes, which have been associated with periodontal disease. These organisms cannot be cultured directly, and quantification requires an indirect technique. Two of our monoclonal antibodies to *T. Dentocola* are patented.

The chemistry department is working hard at "the bench" on time-release microencapsulated anesthetics, antibiotics, and analgesics. The field applications for this technology are almost limitless. The dental investigations department has several ongoing studies tracking dental emergencies and disease rates in all the branches of service. NDRI is focused on dental emergencies encountered by independent duty corpsmen while on deployment.

Of all the projects under way at this time, perhaps none requires more teamwork than the co-location. Since Army personnel began arriving in 1997, a wide variety of large and small issues have been addressed. As watchbills, hours of operation, physical readiness training programs, leave and liberty policies, and many other functions have been merged, standard operating procedures frequently taken for granted have been reworked in every detail to incorporate the service-specific and unique requirements and traditions. Ways had to be found to make two different funding systems work in a coordinated manner to pay shared expenses, such as utilities.

Daunting at first, a systematic, common-goal-oriented approach through timely committee work produced effective results. The successful co-location of military dental

research at Great Lakes is truly the result of everyone pulling together with an appreciation of each other's situations. The benefits have been consistent with the classic concept that the whole is greater than the sum of the parts. USADR and NDRI have been able to develop a true synergy, in addition to the obvious savings in personnel that come with a combined administration. In addition, the scientific expertise each command has brought to the co-location has complemented the other command and resulted in a much more well-rounded research staff. The staff of civilian and military professionals now includes 7 Ph.D.'s, 9 dentists with additional master's degrees or

higher training, 2 veterinarians, and over 30 skilled technicians.

Ask anybody at USADR or NDRI, and they will tell you that joint military dental research is committed to continuous quality improvement, teamwork, professional and personal growth, and customer service. Whether it's steamin' with the Army or rollin' with the Navy, a revitalized military dental research program is on the move. □

When this article was written LCDR Patterson was a researcher at the Naval Dental Research Institute, Great Lakes, IL.

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Navy Medicine Research and Development Highlights

●Aviation Selection Test Battery on the NET

Each year approximately 70,000 prospective Navy and Marine Corps aviation candidates contact recruiting offices around the country. After initial screening, approximately 10,000 individuals take the Aviation Selection Test Battery (ASTB), a paper-and-pencil test measuring basic math, verbal, and spatial skills, offered at over 150 recruiting sites. The ASTB is designed to reduce early stage (i.e., ground school and primary training) attrition rates and save training dollars and personnel. The volume of remote testing made the ASTB an ideal candidate for computer-based testing via the Internet. Four years ago a team of aerospace experimental psychologists and software engineers at the Naval Aerospace Medical Research Laboratory (NAMRL), Pensacola, FL, began creating and testing a computer-based version of the ASTB called the Automated Pilot Examination (APEX) system. These scientists developed software to present the test in a straightforward and user-friendly manner, similar to the paper ASTB. Difficult issues such as timing of each portion of the test, graphics and text quality, scoring, and presentation of practice questions were resolved. The advantages of the electronic test include no booklets or answer sheets to edit, reproduce, and distribute; rapid turn-around time for test results; enhanced security of test items; the ability to incorporate multimedia test items; ease of modification to test items, and improved administrative controls. With this system, a recruiting office that has a Windows-based computer system and a modem or direct Internet connection can easily run the software and execute a test session. A recruiter can log in to the server and request a test. Once the recruiter's identification is verified, the test is downloaded, a potential candidate takes the test, and the test answers are uploaded to the server. The answers are automatically scored and the recruiter receives an automated E-mail with the test results. Scientists at NAMRL recently completed validation studies that showed an individual's test results are not biased by taking the

ASTB on a computer. Testing is scheduled to begin at the Navy Recruiting District, San Francisco, CA. For more information on research efforts at NAMRL visit the laboratory at <http://www.namrl.navy.mil>.

●Patent Issued for New Fluorescent Reagent for Use in 5-Minute Test to Detect Periodontal Disease

Currently, cumbersome and time-consuming methods are used to detect the presence of certain microorganisms such as *Porphyromonas gingivalis* and *Treponema denticola* (suspected causes of periodontal disease and tooth abscesses). Treatment usually consists of scaling and root planing or local implantation of fibers impregnated with antibiotics; both are labor-intensive and lengthy procedures that would not be available to the dentist in the field. Navy dental researchers have shown that this newly patented test can be used to demonstrate the presence of protease (an enzyme that digests proteins) in periodontal pockets. Scientists at the Naval Dental Research Institute (NDRI), Great Lakes, IL, are comparing several chair-side tests that detect the presence of destructive microorganisms (bacteria, yeast, and others) which might allow dentists to diagnose and begin treatment in the same visit. NDRI scientist Sylvia Z. Schade, Ph.D. and Michael E. Jolley, Ph.D., a civilian research partner, received a patent for their invention of a new fluorescent reagent used in fluorescence polarization assays to detect protease enzymes. The assay can test a small quantity of plaque (which consists mostly of bacteria) from one tooth for protease enzymes in less than 5 minutes. Testing around individual teeth is useful, since it might be a means for determining which teeth to treat in periodontal patients and for monitoring whether treatment is effective. In the next few years, the test will be used to assess whether this type of protease activity can predict future onset of periodontal disease. For more information on research efforts at NDRI visit the laboratory at <http://support1.med.navy.mil/ndri/>.—BUMED(MED-26)

INDEX

Vol. 89, Nos. 1-6, January-December 1998

- ADOLESCENT clinic, Naval Medical Center San Diego, preventing hepatitis B 1:1
- Airplane crash, Korean Airlines Flight 801 1:4
- Allen, P.D., LT, MSC, medical support for minefield operations 1:3
- Amos, J.S., LT, NC, convalescent leave guidelines: successful application in general surgery 3:9
- Anesthesia, operational, readiness concerns in 4:10
- Anthrax, combating the threat of 4:1
- Army Dental Research Detachment 6:22
- Arthur, D., CAPT, MC, first fleet hospital training set at Naval Hospital Camp Lejeune 3:1
- Astronauts
mission to *Mir* 1:15
spaceflight on human physiology, challenges of 1:11
- Auffarth, B., LCDR, MC, USNR, convalescent leave guidelines: successful application in general surgery 3:9
- Aviation Selection Test Battery 6:25
- BAKER, G., CAPT, MSC, the TETT team 3:13
- Balloon flight, *Strato-Lab High 5*: triumph and tragedy 5:6
- Baltic Challenge: partnership for peace program 6:4
- Battle Station Sick Bay: Navy Medicine in World War II* 1:32
- Becker, F., advances in Navy pharmacy information technology: accessing Micromedex via the composite healthcare computer system and local area networks 6:10
- Bohner, B.K., CAPT, MC
caring for Guantanamo Bay's Cuban exile community 6:1
medical support for minefield operations 1:3
- Brings, H.A., CDR, MC, convalescent leave guidelines: successful application in general surgery 3:9
- Brown, J.L., LCOL, MC, USAR, readiness concerns in operational anesthesia 4:10
- Bryson, M., LCDR, MSC, VTT is moving information . . . not people 2:4
- CANCER, skin, first Mohs micrographic surgery performed at NMCP 2:2
- Career talks, caring for your people 4:21
- Carey, N.B., Ph.D., successes of Kernel Blitz '97 medical play 4:17
- Carter, G., LCDR, MSC, MED-27: tracking the "right people" 2:12
- Case management in the military health care setting 5:12
- Civil War medicine museum 5:19
- Claborn, D.M., LCDR, MSC, teaching preventive medicine for deployed units: the operational preventive medicine course 2:16
- Collins, P.M., CAPT, NC, USNR
Baltic Challenge: partnership for peace program 6:4
in memoriam on CAPT W.L. Jackson, NC (Ret.), fourth Director of the Nurse Corps 4:25
- Computer system, healthcare, accessing Micromedex 6:10
- Convalescent leave guidelines 3:9
- Cowan, M.L., RADM, MC, receives second star 5:4
- Cox, L., LT, *The Zone*: dietary cure-all or junk science? 6:18
- Crash, Korean Airlines Flight 801 1:4
- Cuban exile community, caring for 6:1
- DANIEL, J.C., CDR, MC, preventing hepatitis B: immunization at the adolescent clinic, Naval Medical Center San Diego 1:1
- Dasler, A.R., CAPT, MSC (Ret.), in memoriam 1:31
- Davis, J., LCDR, USNR, World War II medical personnel tell their stories 1:32
- Dental
Naval Dental Research Institute 6:22
periodontal disease, a test to detect 6:25
technicians, fifty years of service 2:19
U.S. Army Dental Research Detachment 6:22
- de Savorgnani, A.A., CAPT, NC, caring for your people: "career talks" 4:21
- DeWeese, M.H., CDR, NC, case management in the military health care setting: development of the health plan model 5:12
- Diaz, E.A., HM2, awarded the Navy and Marine Corps Medal 2:1
- Diet, *The Zone*: dietary cure-all or junk science? 6:18
- Dimitry, T., Ph.D., innocence of warriors 2:23
- DNA research 5:1
- Durham, R.F., CDR, MC, flight surgeon, pursues wound care 2:24
- Dwyer, R.C., CAPT, MC, USNR, convalescent leave guidelines: successful application in general surgery 3:9
- EYEWEAR, military lens crafters 1:24
- FAHEY, J., CAPT, MC, MED-27: tracking the "right people" 2:12
- Faust, J., R.N., case management in the military health care setting: development of the health plan model 5:12
- Flag officer selections
Cowan, M.L., RADM, MC 5:4
Johnson, J.A., RADM-selectee, MC 5:4
- Fleet hospital training set, first at Naval Hospital Camp Lejeune 3:1
- Flint, J.P., LCDR, MC, USNR, convalescent leave guidelines: successful application in general surgery 3:9
- GALEAS, D., MAJ, NC, USA (Ret.), readiness concerns in operational anesthesia 4:10
- Garcia, A., AFB2, helped rescue Lithuanian man 6:6
- Garcia, F., Ph.D., successes of Kernel Blitz '97 medical play 4:17
- Gay, D., hospital corpsmen awarded medals for heroism 2:1
- Great Lakes, IL, Naval Training Center 6:22
- Grogan, J., successes of Kernel Blitz '97 medical play 4:17
- Guam
crash of Korean Airlines Flight 801 1:4
super typhoon 1:10
- Guantanamo Bay, Cuba
caring for the Cuban exile community 6:1
medical support for minefield operations 1:3

NOTE: Figures indicate the issue and page in Volume 89 of *Navy Medicine*. For example, 1:1 shows the article may be found in issue No. 1 (January-February 1998), page 1.

- HACALA, M.T., HMCS(FMF)
above and beyond: hospital corpsman receives nation's highest honor: R. Ingram 5:25
Hospital Corps hero and historian: George G. Strott 1:28
remembering the *Maine* 100 years later 1:26
Navy dental technicians: fifty years of service 2:19
U.S. Navy Hospital Corps: a century of tradition, valor, and sacrifice 3:12
- Hansen, C., LTJG, MSC
hospital disaster preparedness: Are you ready for a jumbo jet crash in your town? 1:4
super typhoon hammers Guam 1:10
Hardwiring Navy medicine for readiness 3:5
- Harris, C., CAPT, MC, USNR, convalescent
leave guidelines: successful application in general surgery 3:9
- Hasson, E.V., R.N., the Navy Nurse Corps 4:22
- Health care
military, case management in 5:12
naval health services doctrine 6:13
pharmacy information technology, Navy, advances in 6:10
- Hepatitis B, preventing, immunization at the adolescent clinic, NMC San Diego 1:1
- Herman, J.K.
Battle Station Sick Bay: Navy Medicine in World War II 1:32
interview with CAPT J. Linenger, MC, physician on *Mir* 1:15
life as a hospital corpsman at Naval Hospital Canacao, Philippine Islands, 1940-41 2:15
Strato-Lab High 5: triumph and tragedy 5:6
- History
Battle Station Sick Bay: Navy Medicine in World War II 1:32
Civil War medicine museum 5:19
dental technicians, fifty years of service 2:19
Hospital Corps, Navy
a century of tradition, valor, and sacrifice 3:12
Ingram, R., receives Medal of Honor 5:25
Irvin, E.J., life as a hospital corpsman at Naval Hospital Canacao, Philippine Islands, 1940-41, 2:15
Strott, G.G., Hospital Corps hero and historian 1:28
Vietnam, innocence of warriors 2:23
Nurse Corps, first superintendent of 4:22
Strato-Lab High 5: triumph and tragedy 5:6
USS *Maine* 100 years later 1:26
woman prisoner of Japan: W.L. Jackson 5:16
- Holmes, E., CAPT, MC, Force Surgeon 4:14
- Hoover, G., HMC(AW/FMF), NOSTRA: military lens crafters 1:24
- Hospital Corps, Navy
a century of tradition, valor, and sacrifice 3:12
Diaz, E.A., HM2, awarded the Navy and Marine Corps Medal 2:1
Ingram, R., receives Medal of Honor 5:25
Irvin, E.J., life as a hospital corpsman at Naval Hospital Canacao, Philippine Islands, 1940-41 2:15
Kampen, R., HM2(FMF), conducts research with Navy scientists 5:1
Money, J., HM3, helped rescue Lithuanian man 6:6
Montgomery, D., HM3, helped rescue Lithuanian man 6:6
Mullen, C.C., HM2(SS), awarded the Navy and Marine Corps Medal 2:1
Scanlon, S., HM2, conducts research with Navy scientists 5:1
Strott, G.G., hero and historian 1:28
Vietnam, innocence of warriors 2:23
Hospital disaster preparedness 1:4
Hospitals (see Naval Hospitals)
Howard, C.M., LCDR, MSC, USNR, MED-27: tracking the "right people" 2:12
- INGRAM, R., receives Medal of Honor 5:25
- In memoriam
Dasler, A.R., CAPT, MSC (Ret.) 1:31
Jackson, W.L., CAPT, NC (Ret.) 4:25
Lukash, W.M., RADM, MC, (Ret.) 3:27
Wheeler, C.M., CAPT, DC, USNR (Ret.) 1:31
- Irvin, E.J., life as a hospital corpsman at Naval Hospital Canacao, 1940-41 2:15
- JACKSON, W.L., CAPT, NC (Ret.)
in memoriam 4:25
woman prisoner of Japan 5:16
- Jacobs, D., JO1, professor teams with Navy doctors in knee research 4:2
- Johnson, J.A., RADM-selectee, MC 5:4
- KAMPEN, R., HM2(FMF), conducts research with Navy scientists 5:1
- Keeley, F.R., JO1(SW), great hope results in great comfort 6:8
- Kernel Blitz '97 medical play 4:17
- Kirshner, A., CDR, MSC, MED-27: tracking the "right people" 2:12
- Knee research 4:2
- Koenig, H.M., VADM, MC, readiness reengineering message 2:6
- Koerner S., LCDR, MSC, advances in Navy pharmacy information technology: accessing Micromedex via the composite healthcare computer system and local area networks 6:10
- Korean Airlines Flight 801 crash 1:4
- Kwon, Young, Professor, teams with Navy doctors in knee research 4:2
- LANDMINES, medical support for minefield operations 1:3
- Leave guidelines, convalescent 3:9
- Ledbetter, E., CAPT, MC, teaching preventive medicine for deployed units: the operational preventive medicine course 2:16
- Levy, R.R., Ph.D., successes of Kernel Blitz '97 medical play 4:17
- Linenger, J., CAPT, MC, physician on Russian space station, *Mir* 1:15
- Lithuania
boy gets help for rare birth defect aboard *Comfort* 6:8
man rescued by Sailors 6:6
- Liver, hepatitis B, immunization at the adolescent clinic, NMC San Diego 1:1
- Lukash, W.M., RADM, MC (Ret.), in memoriam 3:27
- MAGNUSSON, K., LCDR, MSC, hardwiring Navy medicine for readiness 3:5
- Marines
combat boot, new 2:28
medical support for minefield operations 1:3
Vietnam, innocence of warriors 2:23
- McCellan, E., ABH1, helped rescue Lithuanian man 6:6
- McClain, D., CDR, NC, MED-27: tracking the "right people" 2:12
- Medical Service Corps, taking care to the deckplates 4:8
- Menon, P., CAPT, MC, performed first Mohs micrographic surgery at NMCP 2:2
- Micrographic surgery, Mohs 2:2
- Micromedex, accessing, advances in Navy pharmacy information technology 6:10
- Military health care setting, case management 5:12
- Military lens crafters, NOSTRA 1:24
- Minefield operations, medical support for 1:3
- Mir*, Russian space station 1:15
- Mohs micrographic surgery, first performed at NMCP 2:2
- Money, J., HM3, helped rescue Lithuanian man 6:6
- Montgomery, D., HM3, helped rescue Lithuanian man 6:6
- Moone, D.E., museum showcases Civil War medicine 5:19
- Morales, M., LT, MSC, USNR, the development and refinement of naval health services doctrine 6:13
- Moran, J., CAPT, NC, the TETT team 2:13
- Mullen, C.C., HM2(SS), awarded the Navy and Marine Corps Medal 2:1

- Murdock, E.J., Jr., LCOL, NC, USAR, readiness concerns in operational anesthesia 4:10
- Museum of Civil War Medicine 5:19
- NATIONAL Museum of Civil War Medicine 5:19
- Naval Dental Research Institute 6:22
- Naval health services doctrine, the development and refinement of 6:13
- Naval Hospitals
- Camp Lejeune, CA, first fleet hospital training set 3:1
 - Guam
 - crash of Korean Airlines Flight 801 1:4
 - super typhoon 1:10
 - Guantanamo Bay, Cuba
 - caring for the Cuban exile community 6:1
 - medical support for minefield operations 1:3
- Naval Medical Centers
- Portsmouth, VA, first Mohs micrographic surgery performed 2:2
 - San Diego, CA, preventing hepatitis B, immunization at the adolescent clinic 1:1
- Naval Medical Research and Development Command highlights (see also Navy Medicine highlights)
- adenovirus epidemics 1:30
 - basic training, positive personality changes during 3:28
 - dental research, Navy-Army 3:28
 - heat monitoring system for SMART ship 4:28
 - malaria infection 4:28
 - Marine combat boot, new 2:28
 - Sailors staying fit 2:28
 - travelers' diarrhea, oral vaccine for 1:30
- Naval Ophthalmic Support and Training Activity (NOSTRA): military lens crafters 1:24
- Naval Submarine Medical Research Laboratory's new web site 5:28
- Navy Medicine Research and Development highlights
- Aviation Selection Test Battery 6:25
 - Cobra Gold 98 diarrhea and fever study 5:28
 - Naval Submarine Medical Research Laboratory's new web site 5:28
 - periodontal disease, 5-minute test to detect 6:25
 - Navy medicine's readiness reengineering journey 2:7
- Nelson, R.A., RADM, MC, nominated for Surgeon General 4:7
- NOSTRA (Naval Ophthalmic Support and Training Activity): military lens crafters 1:24
- Nurse Corps, Navy
- first superintendent: E.V. Hasson 4:22
 - Jackson, W.L., CAPT (Ret.) 4:25, 5:16
- OLLIVIER, J.E., LTJG, MSC, USNR, challenges of spaceflight on human physiology 1:11
- Olson, M.C., LCDR, MSC, USNR, the Force Surgeon at work 4:14
- PATTERSON, C., LCDR, DC, steamin' with the Army 6:22
- Perciballi, J.A., CDR, MC, convalescent leave guidelines: successful application in general surgery 3:9
- Periodontal disease, 5-minute test to detect 6:25
- Pharmacy information technology, Navy, advances in 6:10
- Prather, V.A., Jr., LCDR, MC, *Strato-Lab High 5*: triumph and tragedy 5:6
- Preventive medicine course for deployed units 2:16
- RATTELMAN, C., successes of Kernel Blitz '97 medical play 4:17
- Readiness concerns in operational anesthesia 4:10
- Readiness reengineering
- hardwiring Navy medicine for readiness 3:5
 - How do we know we are ready? 4:4
 - Koenig, H.M., VADM, MC, message on 2:6
 - MED-27: tracking the "right people" 2:12
 - naval health services doctrine, the development and refinement of 6:13
 - Navy medicine's readiness reengineering journey 2:7
 - the TETT team 2:13
 - What about the dollars? 3:7
- Ross, M.D., CDR, USNR, *Strato-Lab High 5*: triumph and tragedy 5:6
- SAILORS help rescue Lithuanian man 6:6
- Scanlon, S., HM2, conducts research with Navy scientists 5:1
- Ships
- taking care to the deckplates: the MSC way 4:8
 - USS Antietam, *Strato-Lab High 5*: triumph and tragedy 5:6
 - USS *Comfort*
 - Baltic Challenge: partnership for peace program 6:4
 - Lithuanian boy gets help for rare birth defect 6:8
 - USS *Maine* 100 years later 1:26
- Skin cancer, first Mohs micrographic surgery performed at NMCP 2:2
- Smith, A.M., CAPT, MC, USNR, readiness concerns in operational anesthesia 4:10
- Snyder, D., CDR, MSC, Navy medicine's readiness reengineering journey 2:7
- Sollock, R., CAPT, MC, the TETT team 2:13
- Space
- mission to *Mir* 1:15
 - spaceflight on human physiology, challenges of 1:11
 - Strato-Lab High 5*: triumph and tragedy 5:6
- Stevenson, M.J., LT, MSC, taking care to the deckplates: the MSC way 4:8
- Strato-Lab High 5*: triumph and tragedy 5:6
- Strott, G.G., Hospital Corps hero and historian 1:28
- Surgery, micrographic, Mohs 2:2
- TINLING, W., CDR, MSC, the TETT team 2:13
- Training
- and education tiger team (TETT) 2:13
 - Baltic Challenge: partnership for peace program 6:4
 - fleet hospital training set, first at Naval Hospital Camp Lejeune 3:1
 - Kernel Blitz '97 medical play 4:17
 - Naval Training Center, Great Lakes 6:22
 - preventive medicine course for deployed units 2:16
 - video teletraining 2:4
- Trunkey, D., Ph.D., successes of Kernel Blitz '97 medical play 4:17
- Turner, P., CDR, NC, How do we know we are ready? 4:4
- Typhoon hammers Guam 1:10
- U.S. Army Dental Research Detachment 6:22
- USS (see Ships)
- VIDEO teletraining (VTT) is moving information . . . not people 2:4
- Vietnam, innocence of warriors 2:23
- WATSON, A., HM3, first Mohs micrographic surgery performed at NMCP 2:2
- Wheeler, C.M., CAPT, DC, USNR (Ret.), in memoriam 1:31
- Whitmeyer, A., LCDR, MSC, What about the dollars? 3:7
- Williams, J., HM3, hospital corpsmen conduct research side by side with Navy scientists 5:1
- Woman prisoner of Japan: W.L. Jackson 5:16
- Wound care 2:24
- Wright, J.E., HM2, hospital corpsmen conduct research side by side with Navy scientists 5:1
- Wyatt, E.P., CAPT, MSC, the development and refinement of naval health services doctrine 6:13
- ZONE diet, dietary cure-all or junk science? 6:18
- Zuzelski, K., LT, *The Zone*: dietary cure-all or junk science? 6:18

Navy Medicine 1920



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